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ABSTRACT

Project CHILD (Computers Helping Instruction and Learning Development) is a major research project designed to develop an innovative computer-integrated instructional program for the elementary school. It has been a four-year effort funded by grants totalling $1,055,000 from the Florida Department of Education with additional support from 7 Florida school districts and over 15 business partners. Project CHILD provides a unique synthesis of effective practices, curriculum realignment, and a new organizational structure for the elementary school. The program is designed for grades K-5 and covers the subject areas of reading, language arts, and mathematics. Project CHILD provides the model, supporting materials, and integrative applications of technology to enable today's elementary school teachers to take their first steps on the bridge to the future. This paper provides a description of the program and summary of the findings from the summative evaluation phase of the project which was conducted during the 1989-90 school year. The key finding from that evaluation concluded that Project CHILD has been an effective method of teaching students. (38 references) (Author/DB)

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Project CHILD

(Computers Helping Instruction and Learning Development)

Integrating Computers into the Elementary School: A Summative Evaluation

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Abstract

Project CHILD (Computers Helping Instruction and Learning Development) is a major research project designed to develop an innovative computer-integrated instructional program for the elementary school. It has been a four-year effort funded by grants totalling $1,055,000 from the Florida Department of Education with additional support from seven Florida school districts and over fifteen business partners.

Project CHILD provides a unique synthesis of effective practices, curriculum realignment, and a new organizational structure for the elementary school. The program is designed for grades K-5 and covers the subject areas of reading, language arts, and mathematics. Project CHILD provides the model, supporting materials, and integrative applications of technology to enable today's elementary school teachers to take their first steps on the bridge to the future.

This paper provides a description of the program and summary of the findings from the summative evaluation phase of the project which was conducted during the 1989-90 school year. The key finding from that evaluation concluded, "...Project CHILD has been an effective method of teaching students" (Executive Summary, page 4).

Project CHILD: Goals and Objectives

The major goal of Project CHILD is to begin to transform elementary schools to meet the needs of the 21st century. Project CHILD seeks to (1) create the ideal conditions for learning, (2) create cohesive units of work which foster strategies for thinking, and (3) realign curriculum for reading, language arts, and mathematics in order to cover legally mandated content as well as fully integrate computer technology into the curriculum. Project CHILD also seeks to make a positive contribution to academic achievement and positively affect attitudes and behaviors of teachers and students.

Intended Audience and Sample Population

Project CHILD is intended for use in developmental classrooms for grades K-5. **All** children are encouraged to participate, with pull-outs discouraged. There is new evidence that children with various differences (attention deficit, at-risk profile, visually impaired, hearing impaired, mild learning disabilities) are successfully mainstreamed into Project CHILD classrooms. The program is not designed to include students who are severely emotionally disturbed, are severely learning disabled, have limited English proficiency, or children correctly diagnosed with specific learning disabilities.

Project CHILD was field-tested in two school districts in Florida. Westside Elementary School in Volusia County (Northeast Florida) implemented the program with IBM PCjr hardware and software. The other site, Valparaiso Elementary School in Okaloosa County (Northwest Florida), used Apple IIe hardware and software. A one-year formative evaluation was conducted at these two schools during the 1988-89 school year (Orr, Butzin & Bergquist, 1989). This was followed by a one-year summative evaluation in 1989-90, which is the focus of this article.

Within each school, six classrooms and teachers, one each for grades K-5, participated in Project CHILD. The rest of the school maintained its traditional program. Approximately 400

students and 14 teachers participated in Project CHILD during the two-year field test. Students were assigned to Project CHILD classrooms using the same criteria as for the non-CHILD classrooms. Parents had the option of excluding their children from the Project CHILD sample (less than 1% opted out).

The two project schools were different in composition, providing a contrast for the implementation of the project with different populations. The Volusia County school had a larger proportion of minority students (55%) and attained scores on national achievement tests in the average range (40-60th percentiles). The Okaloosa County school had only 5% minority students and attained high achievement test score levels (60-80th percentile). These two sites are representative of numerous Florida schools and provided a good inferential base for the evaluation of the project.

Background and Philosophy

Project CHILD was developed in response to the author's own experiences as a parent, classroom teacher, and ethnographic researcher who has tried to study the world of the classroom from the child's point of view (Butzin, 1984). The design of Project CHILD grew out of the desire to make schools more responsive to the needs of young children, yet also meet the needs of overworked and overwhelmed teachers.

The Project CHILD model is based on several philosophical beliefs about education. In a good education there is involvement, relevance, and thinking (Glasser, 1975). Students must experience repeated success. The following conditions must be present for this to happen:

1. Active Learning. Students must be actively involved in the learning process. "Frontal teaching" (the teacher imparting knowledge from the front of the room) must be balanced with participation from the students in individual learning tasks and in small learning teams. Instruction should draw on the experiences of the students.

2. Shared Responsibility. Teachers must share responsibility with the students by giving them opportunities to make choices and decisions affecting their learning. Teachers must share control of classroom management, involving students in cooperative team meetings to guide the students toward self-discipline.

3. Cooperation and High Expectations. The classroom environment must reflect a spirit of cooperation and high expectations. Competition must be fair, giving everyone an equal opportunity to win. Process becomes as important as product; the process of learning and improving must be valued as much as the final product.

4. Balanced Curriculum, Activities, and Materials. The curriculum must be balanced with an equal emphasis on a diversity of subjects, including reading and language arts, mathematics, science, social studies, art, music, foreign language, and physical education. Subjects should be integrated around holistic themes as much as possible. A variety of learning activities and materials must also serve a diversity of learning styles and interests.

Theoretical Framework

The Project CHILD model is grounded in theory. The structure of the Project CHILD model and content of the Project CHILD materials reflect the following theoretical principles:

1. Human Dynamics Theory. Students will make an effort to work harder in a classroom where their basic needs are being met (Glasser, 1986). These basic human needs include:

Belonging. Students will not risk making mistakes unless they feel secure. They seek friendship with peers and approval from chosen adult role models.

Freedom. Students seek increasing independence. They work harder when they perceive they have some control over their destiny.

Fun. Students need humor and joy. Maria Montessori reminds us that for young students "play is the child's work."

Power. Students need to feel useful. They want to make decisions and demonstrate competence.

2. Motivational Theory. The effort students will expend on a task is determined by the degree to which they expect to be successful and expect the task to meet their needs. Both factors must be present. Students will invest no effort on a task they perceive either as having no value to them or as being so difficult that they have no expectation of success (Feather, 1982).

3. Behavior Modification Theory. Positive reinforcement (rewards) can shape students' behavior. To be effective, rewards should be immediate and frequent. "Catching students being good" will help them internalize desired behavior and lead to a decreasing need for external rewards, such as stickers or candy. Negative reinforcement (punishments) should reflect logical consequences for the bad behavior (Skinner, 1969).

4. Learning Modality Theory. Students learn in different ways and exhibit different talents. Classroom materials and learning activities need to accommodate these differences so that all students can experience success.

There are at least four basic learning styles: concrete experience (touching), reflective observation (watching), abstract conceptualization (thinking), and active experimentation (doing). Some students may rely on one style, while other students may employ several or all (Kolb, 1983).

Hemispheric dominance in the brain may determine whether a student learns better through sequential patterns using auditory and visual stimuli (left brain) or through global and intuitive patterns using tactile stimuli (right brain). Many students may use both spheres effectively, while others show dominance in one sphere or the other (Bogen, 1969).

Students' talents are reflected in at least seven forms of intelligence: linguistic (writer), musical (musician), logical (mathematician), spatial (artist), bodily kinesthetic (athlete), interpersonal (sensitivity to others), and intrapersonal (sensitivity to one's own feelings). Students may show strength in several of these areas (Gardner, 1983).

5. Developmental Theory. As they grow, children pass through stages of development, both intellectually and socially. Effective instruction must match the child's level of cognitive development, moving from concrete operations to abstract concepts (Piaget, 1950).

A child's emotional development moves from dependence toward independence. The learning environment and materials must be structured to match the child's social development (Erikson, 1963).

Children seek order and control. The classroom and its materials must be clearly structured and organized to meet this need (Montessori, 1964).

How the Program Operates

There are twenty essential components to Project CHILD and specific implementation guidelines, described in detail in a *Teacher's Manual.* A three-day video-based training program prepares teachers for implementation. Within this framework teachers adapt Project CHILD to their teaching style and enhance it with their own ideas and creative energy. Innovation is encouraged.

Three classrooms form a CHILD cluster. One cluster consists of primary grades (K-2) and the other cluster consists of intermediate grades (3-5). Each teacher, in addition to being responsible for one class in a particular grade level, becomes a content specialist for one subject, be it reading, language arts, or mathematics. For example, a first-grade teacher specializing in mathematics would teach kindergarten, first, and second graders mathematics for one hour each and then work with homeroom first graders in other content areas such as science and social studies for the rest of the day.

Teachers work closely with the other members of the cluster team. The Project CHILD training teaches them how to work as part of a professional team by providing specific meeting agenda formats, peer observation guides, and peer-coaching techniques.

Project CHILD teachers work with the same students in their specialty for three years. They will thus support and nurture the same students from kindergarten through second grade in a primary cluster or from third through fifth grade in an intermediate cluster. This means that each year they work with a new group of students in the lowest grade class in their cluster, but the other two classes will consist of students they already know and whose needs they understand. Students from each grade in the cluster move among the classrooms to spend one hour working in each subject area.

Each Project CHILD classroom is organized with learning stations dedicated to the subject specialty. There is a computer station with 3-6 computers, a teacher station for small-group instruction, and textbook and writing stations, as well as stations for hands-on activities. Following a precise management plan, students move to the various learning stations. Station *Task Cards* assist in this process, and activities are recorded in a book called a *Passport.*

A typical hour in a Project CHILD classroom opens with a teacher-directed whole-group lesson followed by extended work at the learning stations. Students usually are able to visit two or three stations. A closing whole-group activity allows time for sharing and reflecting on the day's work before moving on to the next Project CHILD classroom.

Required curriculum content is covered in six-week thematic units. These are detailed in six *Learning Activities Guides*. The units are based on the latest research in reading and language arts (whole language, writing process) and mathematics (concept development, problem solving). The Guides are child-centered and geared to developmental characteristics for primary (five-to seven-year-old) and intermediate (eight-to ten-year-old) students. Specific skills, such as those required by the State of Florida are embedded within the units rather than taught in isolation. A balance is struck between process and skills, with skills being applied within the context of the unit theme.

All units have been cross-referenced to include the State of Florida's Minimum Student Performance Standards and Standards of Excellence, as well as district and standardized test objectives. The units also include expanded objectives that look toward educational requirements for the future, including word processing, keyboarding, and information-management skills. The units incorporate daily use of related computer software. Suggestions for evaluating and monitoring student progress are included in the Guides. Six companion books developed by Project CHILD teachers, *Station Activities Resource Books*, provide ideas and

patterns for hands-on station activities to support learning objectives.

How Project CHILD Changes Current Practice

The major outcome of Project CHILD has been to provide a clear and meaningful alternative classroom structure so that technology and hands-on learning can become integrated into the curriculum. This outcome can best be described through descriptive data. The following two scenarios are offered to contrast the difficulties inherent in the traditional elementary school structure with the changed structure of Project CHILD.

First, let's examine traditional schooling for the following hypothetical student. Young Jerome enters kindergarten expecting to graduate in the year 2003. He eagerly begins school, anticipating an exciting learning journey. For growing numbers of children, that journey will cease very quickly to be exciting.

Jerome will be placed in a room with 25-35 other students where he will remain with his teacher, Ms. Papier, for the next 180 school days. Once Ms. Papier closes her door, she is the master of the universe. Jerome hopes the master will be kind and wise. Jerome, whose world is awash in electronic media, will soon discover that the master's instructional tools consist mainly of paper and chalk.

After the "group socialization" of kindergarten has been completed, Jerome will be passed on to the next teacher for another 180 days of "instruction." In the first grade, he will be subjected to his initial dose of reading group instruction, being first classified as a Robin, Redbird, or Buzzard. Most of his morning will be spent doing seatwork (copying from the board and working in workbooks and on ditto worksheets) while waiting for his reading group to be called for a 15-minute basal reader lesson with the teacher. He may not talk or move from his desk lest his name be written on the board. The consequences for that offense range from spanking to public humiliation.

The afternoon consists of a 30 minute math lesson, a lecture from the teacher followed by practice in his workbook. Depending upon his teacher's interest and enthusiasm, there may be a science or social studies lesson from the textbook. Of course all these lessons must be sandwiched in between a multitude of alphabet soup pull-outs and distractions (Chapter I, ESE, ESL, LD, SLD, ARC), special area classes (music, physical education, art, guidance, library, computer lab), lunch counts, candy sale money collection, snack time, intercom announcements, assemblies, field trips, school pictures, fluoride swishing, head lice checks, etc. (Butzin, 1984). And so it continues, from year to year, from teacher to teacher (Goodlad, 1983).

While many children perseveré and serve out their time, 25-30 percent drop out before graduation (Conditions of Education Report to Congress, 1990). A precious few of those who remain actually acquire the knowledge they will need to enter the increasingly sophisticated workplace of the Information Age. By the time they are seniors in high school, only six percent of seventeen-year-olds can solve multi-step problems; seven percent can infer relationships and draw conclusions using detailed scientific knowledge; five percent can synthesize and learn from specialized reading materials; while twenty-seven percent can perform a persuasive writing task to an "adequate" level (National Assessment of Educational Progress, 1990).

Beginning with the impassioned report, A Nation at Risk (1983), there has been a long litany of calls for educational reform: Educating Americans for the 21st Century, 1983; Making the Grade, 1983; A Nation Prepared: Teachers for the 21st Century, 1986; Transforming American Education: Reducing the Risk to the Nation, 1986. Plans for restructuring the nation's schools have been offered from a wide array of educators, citizens, and politicians (Hart, 1989; Reigeluth, 1989; Shanker, 1990). Visions of the future have been postulated which

recommend radical transformation of the educational system as it currently exists (Cetron, 1985; Shane, 1987; Schlechty, 1990).

Many of these visions for the future include technology as a centerpiece for the restructuring effort (Pearlman, 1989; Kelly, 1990). Yet the effective use of technology remains an illusive goal for most teachers. Lack of classroom equipment in sufficient quantity, lack of training, coupled with limited time and expertise to integrate software into the instructional program cause computers to remain an expensive distraction in the back of the classroom.(Bracey, 1989; Wiske & Houde, 1990; Accomplished Teachers: Integrating Computers into the Classroom, 1989).

The following description of events in a Project CHILD school provides a marked contrast to Jerome's school experiences and shows how Project CHILD improves current practice. This description of three Project CHILD classrooms reveals several areas where CHILD is an improvement over the one-dimensional learning environment in most self-contained classrooms documented by Goodlad and others.

Project CHILD: Passport to the Future
by Barbara Smith, Staff Writer
Bayou Times, Crestview, Florida: September 26, 1990

A Big Chief writing tablet, a couple of number 2 pencils, and a box of Crayolas were once the standard supplies for elementary school students. This year students enrolled in the Project CHILD program at Bluewater Bay and Valparaiso Elementary schools must carry passports to learning stations in the several classrooms they travel to each day.

In Diane Holman's kindergarten class colorful bear cut-outs are suspended above the seating areas that make up a learning station. A bear holding a book lets the kindergartner know that this is the place for reading. Other bears show which station they go to for computer study, listening and viewing, word study, art and activity, and, of course, where they should gather together with the teacher.

Second graders in Mary Sims' class also have bear stations. And when it is time to study math, they gather in small groups at different tables to study numbers, not on pencil and paper yet, but with brightly colored beads, blocks, and geoboards, with which students create patterns with rubber geobands. A task card in each tub of materials tells the student what he is to do at that particular station.

At the beginning of the school year, the children start with free exploration, just having fun with the materials, then move on the next week making patterns with the materials, learning number concepts before actually tackling arithmetic problems on paper or computer. Once the computer is introduced, Sims explained, each child will use one of the three class computers every other day in math, but six or seven times a week for all subjects.

Students go from station to station within their own classroom, and at certain times of the day to two other classrooms, again taking their passports, checking off the tasks they complete at stations there. Kindergarten teacher Diane Holman teaches reading to all three levels in the "Primary Cluster Group," or kindergarten through second grade. For language arts, the students go to Nancy Jurgen's room while Jurgen's first graders are visiting either Sims for their math, or Holman for reading instruction.

At the end of six weeks, students review their passports, comparing overall tasks they accomplished with the goals, both academic and behavioral, they had written weeks before on the first page of the passport. At the back of the passport booklet, they write which things they liked best, or that which they did not like. The teacher and parents also write their

evaluations in the booklet.

Sims, who has taught for seven years and began with the Project CHILD method two years ago, says she has seen positive results in the program, especially with children who have a hard time sitting still and for those who learn quickly. At first she was concerned that her students were not covering the same amount of material as those using the traditional text book methods, but at the end of the year, the accomplishments of Project CHILD students were equal to or better than those in traditional classes.

Students in the program will remain in the same cluster group, with the same teachers for the three primary years, then move on to three years with an intermediate (grades 3-5) group. With this system, the child has the security of a familiar "family", and teachers who can work with individual problems over a longer period of time, gearing the child toward long-term progress. Working with the same children over a period of years, encourages better understanding of each child's particular needs.

At Bluewater Bay School, where a large number of parents requested the program, there are two cluster groups per grade level, or about half the total student body. Many of the students and teachers at Bluewater Bay began the program at Valparaiso Elementary, which was one of two demonstration sites in the state when the program was introduced three years ago.

Bluewater Bay principal, Dr. Robert McEachern, was the principal at Valparaiso when the school was chosen for the pilot program developed by Dr. Sally Butzin at Florida State University. Locally, it was teacher Diane Holman who brought the prospective program to the attention of Okaloosa County schools after learning of it at a conference three years ago.

The program's innovative approach recognizes that students differ from one another, and in their own abilities in different subject matter. Basic subjects can be taught in ways that encourage the child, and critical thinking skills developed through a variety of techniques. These methods encourage active learning, shared responsibility, and fair competition. An awareness that children need a sense of belonging, freedom to work toward independence, a feeling of usefulness and, a sense of learning as fun is basic to the program. "If students could leave school with one thing," says Dr. McEachern, "it is that learning should be fun and should be a life-long process."

To those brought up in the old-school tradition, all this may sound dreadfully foreign -- as foreign, perhaps, as the idea of someone walking on the moon, or computers becoming as common in schools as Red Chief tablets, number 2 pencils, and Crayolas. Whoever thought that students would one day be carrying passports to class, and actually think math is fun?

Summative Evaluation Data Collection Procedures

An extensive independent summative evaluation was conducted to determine the impact of Project CHILD on student achievement, student attitudes, student behaviors, teacher attitudes, and teacher behaviors. These findings are documented in detail in the Summative Evaluation Final Report produced by Evaluation Systems Design, Inc. (1990). Evaluation instruments consisted of standardized tests (CTBS: Comprehensive Test of Basic Skills, Fourth Edition; CAP: Comprehensive Achievement Program; SAM: School Attitude Measure, Form 3), student writing samples, teacher journals, surveys, interviews, classroom observations, and school office records.

Standardized achievement test scores for the two pilot schools were analyzed using

Project CHILD classes compared to all of the other non-Project CHILD classes at the same grade level using 1990 test score data. Individual student test scores for the students in Project CHILD classes, and a random sample of students from the rest of the grade levels were collected using 1988-1990 test score data. The student-level test scores were analyzed using an analysis of covariance procedure with 1988 scores as the covariate. The analysis compared the performances of Project CHILD students with non-CHILD students on the total test battery scores and by subtest.

The evaluators developed standardized procedures and materials to collect student writing samples. Writing prompts were developed to provide developmentally appropriate topics for student writing. Using special materials, samples were collected from 558 students in grades K-5 at the two pilot schools equally representing Project CHILD and non-CHILD students. The evaluators established specific scoring procedures and trained a panel of five judges. Three methods for estimating reliability of ratings between judges were used. All samples were blind-reviewed by at least two judges. The percent of contiguous agreement for the samples was almost 100% for all grade levels.

The constructs "attitude toward school and learning, student responsibility, and self-concept" were assessed using SAM which was administered to both Project CHILD and non-Project CHILD students in grades 1-5 at the two pilot schools. The individual NCE (Normal Curve Equivalent) results were analyzed using analysis of variance procedures and t-tests of group mean differences for Project CHILD classes and non-CHILD classes. Comparisons were made for each of the subscales of SAM and for the total SAM score. Student interviews were also conducted to assess student attitudes.

The evaluators constructed surveys which were distributed to the school principals, and to all teachers from Project CHILD classes and teachers from comparison classes. Surveys were completed by all of the three principals involved in the Project (two original plus a new replacement the second year) and from 14 teachers (eight Project CHILD and six non-CHILD). Survey responses were structured using a four-point Likert scale (Strongly Agree to Strongly Disagree). An option of No Opinion was also provided.

The evaluation team designed a Classroom Observation Form which used a five-point scale (Most of the Time to None of the Time) for observing classroom ambience, teacher instructional mode, and student involvement in various activities during two visits to each project site. A one-day visit in the Fall resulted in 30 separate classroom observations in both Project CHILD and non-CHILD classes; while a one-day visit in the Spring collected 24 classroom observations. In addition, the principals conducted a total of 12 observations in the Fall, but the Spring observations by the principals were not completed. While more intensive ethnographic observations would have been preferred, funding limitations dictated the use of a "snapshot" observation methodology.

In order to document the degree of implementation of the program, Project CHILD teachers completed a weekly Teacher Journal Form which documented the number of days Project CHILD was implemented and comments regarding the project, software, and other topics as appropriate. All twelve teachers in both schools returned their journal pages for all of the six units (only unit six did not produce 100% response). Responses indicated a very high degree of implementation of the program.

During the Spring on-site visit to each school, the evaluators conducted interviews with parents of Project CHILD students. Each teacher was asked to identify three sets of parents who would agree to attend the parent meeting and talk with the evaluators about the impact of Project CHILD on their children and their home. The meetings were well attended at both schools.

At the end of the school year, each pilot school office provided data for students and teachers in Project CHILD and non-CHILD classes. These data included student attendance, discipline referrals, student retentions, and teacher attendance.

Summary of the Summative Evaluation Findings

Detailed analyses, tables, and discussion of these data are provided in the evaluation final report. For purposes of this article results are summarized as follows.

1a. Impact on student achievement as measured by standardized tests:

When compared by group (Project CHILD classes versus non-CHILD classes), Project CHILD class achievement at Valparaiso (as measured by CTBS) overall was equal. Achievement at Westside was significantly higher for CHILD classes (as measured by CAP).

Class NCE	CHILD	Non-CHILD
Valparaiso	67.4	67.8
Westside	60.25	48.75

When compared by individual (three-year trend, analysis of covariance controlled for the effect of prior achievement) also showed that at Valparaiso Project CHILD students' performance was equal to the comparison students. At Westside Project CHILD had a significant positive impact in all subtest areas.

1b. Impact on student achievement as measured by holistically scored writing samples:

The average scores showed slightly higher ratings for the kindergarten CHILD students, slightly lower ratings for third grade CHILD students, and no difference at grades one, two, four, and five. The overall trend was that more Project CHILD papers obtained high ratings.

2a. Impact on teachers as measured by survey, interviews, and classroom observations:

Project CHILD teachers:

...feel a higher level of professional association with a content area.
...have more ties to professional organizations.
...rely less on whole-group instruction.
...use more varied learning activities.
...are more available to assist individual students.
...utilize small-group instruction to the same degree as non-Project CHILD teachers.
...have more student/teacher relationships, "bonding"
...have difficulty meeting with and observing teammates.
...work harder than before.
...would implement Project CHILD if they had it to do over (100%).
...would encourage other teachers to implement Project CHILD (100%).

"Having experienced the benefits of Project CHILD for two years has convinced me there's no better way."

2b. Impact on teachers as measured by attendance rates:

Total figures are about equal, but trends indicate more Project CHILD teacher absence is for professional reasons.

	CHILD	Non-CHILD
Valparaiso:		
Sick leave	1.3%	1.0%
Administrative leave	3.1%	2.5%
Westside:		
Sick leave	1.9%	7.0%
Administrative leave	3.6%	0.6%

3a. Student attitude and involvement as measured by parent interviews:
Parents report that Project CHILD students do more independent reading at home than previously. "Amazed at what their children can read."

3b. Student involvement as measured by school attendance:
No significant differences.

	CHILD	Non-CHILD
Valparaiso:	98.4%	98.8%
Westside:	24.97 DA	23.68 DA

3c. Student attitude and behaviors as measured by average discipline referrals to the office:
Significantly fewer discipline referrals for Project CHILD students.

	CHILD	Non-CHILD
Valparaiso:	5.16	16.16
Westside:	4.67	12.17

3d. Student attitude and behaviors as measured by teacher reports:
Special area teachers report that Project CHILD students are better behaved than other students (except kindergarten at Westside).

3e. Student attitude and behaviors as measured by classroom observation of time-on-task:
Project CHILD classes are more on task than the regular classrooms.

3f. Student attitude and behaviors as measured by classroom observation of independent learning:
Large differences - many more independent learning activities in Project CHILD classrooms.

3g. Technology awareness of students as measured by interviews:
No differences. Both CHILD and non-CHILD students are very technologically aware.

3h. Student attitudes as measured by SAM (School Attitude Measure):
Grade One: no difference
Grade Two: no difference
Grade Three: Project CHILD slightly lower

Grade Four: Project Child slightly higher
Grade Five: no difference

3i. Student attitudes as measured by student interviews:

A greater percentage of the Project CHILD students voiced a positive attitude toward school. The following note (verbatim) received by the Project Director from a fifth grade student at a recent site visit is an example of many unsolicited student comments:

Dear Dr. Butzin,
I glad you envented project child because it's cool. We do our work but it is easier because we get help from each other. It is nicer than reguler class rooms. Thank you for enventing project child.
Sincerely,
Tymon Anderson

3j. Student attitudes as measured by parent interviews:

Reports of large improvement in attitude compared to prior school experiences. "Really like school."

3k. Student behaviors as measured by observations of cooperation and collaboration and special area teacher reports:

Project CHILD students exhibited more cooperative behavior. Project CHILD students collaborated more.

Supplementary Evidence of Success

Since the publication of the summative evaluation final report, Project CHILD expanded to nine elementary schools throughout Florida during the 1990-91 school year. The two original pilot schools expanded to include an additional six classrooms, and the program will be implemented in nineteen schools in 1991-92.

Parent demand for Project CHILD has been strong. There are waiting lists at most CHILD schools. When the pilot school at Valparaiso was rezoned, parent pressure caused the superintendent to pledge to keep Project CHILD at Valparaiso as well as expand to the new school at Bluewater Bay. There are reports that parents in Volusia County are claiming false addresses so as to register their children for attendance in the Project CHILD school zone.

Project CHILD has been designated a "**Program of Excellence**" by the Florida Department of Education. A statewide committee under the Department's Office of Policy Research and Improvement visited Project CHILD at Valparaiso, interviewed teachers and staff, and reviewed documents submitted by the school. The committee selected Project CHILD as one of the ten most outstanding programs in the state in mathematics, science, and computer education.

Interpretation and Discussion of Results

The success of Project CHILD is related to its design as a synthesis of good ideas that work. By actively involving students in interesting tasks and utilizing highly motivating computers with their immediate feedback and tutorial capabilities, engaged time-on-task is increased. An increase in engaged time-on-task is strongly associated with increased achievement (Graden et al., 1982). By providing teachers with a well-developed curriculum and

classroom management system, strategies for teaming and utilizing cooperative techniques, and time to develop a strong relationship with students, the teacher's role is transformed to coach and facilitator. The teacher becomes the "guide on the side" rather than the "sage on the stage" (Mernit, 1990).

Undoubtedly, some of the success of Project CHILD can be contributed to factors beyond its design. One possibility is that having teachers volunteer to participate skewed the talent pool toward the "better" teachers. The teachers also received more coaching from the project staff the first year of field-testing than would normally occur. However, during the second year the program ran as designed, with only the regular support visits.

Also, both pilot schools had strong principals who stayed the course. At one point, seven families from Valparaiso were very dissatisfied with Project CHILD and expressed this in writing and at meetings. Two withdrew their children from the program. Although most of the dissatisfaction was associated with issues unrelated to Project CHILD, it took courage for the principal to stand up to this negative pressure.

There is also question as to whether the selection of the students for the Project CHILD classrooms was as random as the director and evaluators had required. At Westside, an unfortunate conflict with the Chapter I program caused some of those students to be excluded from the Project CHILD classes when Volusia County converted to a two-hour Chapter I pull-out replacement model.

Mobility was a factor which may have negatively clouded Project CHILD's achievement data. Both schools have considerable family mobility (Valparaiso for example serves Eglin Air Force Base) so only about half of the students evaluated had been in Project CHILD since its inception. We suspect that the full power of the program will develop over time as children experience the continuous-progress aspect of the program. Also, teacher mobility resulted in the entrance of two new teachers the second year of the field test who did not receive the full complement of training.

Despite these possible threats to validity, the overwhelming positive evidence and continuing success of the program at additional sites suggests that Project CHILD can be successfully replicated in diverse settings. Now in the fourth year of implementation, all of the original and expansion schools and districts remain enthusiastic about Project CHILD.

Educational Significance of Results

The need for alternative models for improving current educational practice has been well established. The current system is failing too many children. Our society cannot continue to watch its productivity decline and dollars flow overseas to more talented and better-educated foreigners. Our democracy cannot survive an increasingly illiterate population, unable to distinguish the difference between lies and truth.

Successful programs which employ hands-on activities in learning-center environments are currently available. Notable examples are Mary Baratta-Lorton's **Math Their Way** (1976) and Grace Pilon's **Workshop Way** (Harmin, 1990). Yet, none of these incorporates the technological component as does Project CHILD.

Programs that do employ extensive uses of technology are either too radical or too expensive for realistic replication. Examples are ACOT: Apple Classroom of Tomorrow (Warger, 1990), and Model Technology Schools, such as in Florida and California, and the Kitsap model in Washington state (Bruder, 1990). Others are limited to a select subject area, grade level, or special student population. For example, the IBM Writing to Read program (Martin, 1986) is limited to reading/language arts in kindergarten and first grade in a lab

environment. Stan Pogrow's successful HOTS: Higher Order Thinking Skills program is a pull-out model geared to at-risk students in fourth-seventh grades (Pogrow, 1990).

Other programs that employ extensive use of technology across the curriculum are known as Integrated Learning Systems (ILS). Not only are these programs expensive to start up and maintain ($25,000 - $250,000 start-up + $10,000 - $30,000 annual fees), they also fail to show teachers how to fully integrate the ILS into their instructional program. Further, most ILS systems are lab-based and operate tangentially to what the teacher is doing in the classroom (Smith & Sclafani, 1989; Sherry, 1990; Trotter, 1990).

Project CHILD, on the other hand, provides a complete system for fully integrating technology into three subject areas across six grade levels for use with all elementary students. Implementation is possible with existing hardware and software or can be incorporated into more sophisticated networked systems. Project CHILD further provides the teacher with classroom management techniques for using computers and other hands-on learning within the classroom along with strategies for teaming, cooperative learning, and parent involvement. It consists of a coherent set of procedures that can be transferred to today's elementary schools, and has demonstrated a positive effect on achievement and attitudes. Project CHILD is a unique practice whose time has come.

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